

中国蹄盖蕨属的研究 I—属下分类^{*}

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摘 要 蹄盖蕨属是蕨类植物中分类最困难的大属之一, 中国、喜马拉雅和日本为其分布中心。隶属于本属的种实际上是由蹄盖蕨科或广义蹄盖蕨属中其他属被划分出去以后剩余下来的种类集合而成的“大杂烩”, 因此, 它们被放在一起并非是一个单系起源的自然类群; 属下不同类群分化的程度相差也很大, 有的类群进化活跃, 近缘种很多, 有的类群则很孤立, 所以属下单位所包括的种数相差悬殊; 孢子周壁表面褶皱的有无在本属的属下分类中占有重要的位置。已发表的中国蹄盖蕨属植物名称约有 300 多个, 它们初步被处理为 117 种和一些变种和杂种, 本文建议把这些种分为 14 个组和 15 个系。

关键词 植物分类; 蕨类植物; 蹄盖蕨科; 蹄盖蕨属; 中国

A REVISION OF THE CHINESE *ATHYRIUM* ROTH (I) —SUBGENERIC CLASSIFICATION OF THE GENUS

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Abstract *Athyrium* is one of the largest, complex and extremely difficult genera in taxonomic treatment. The area of China, Himalaya and Japan is the geographic distribution center of the genus. In fact, the species in this genus sensu stricto (Ching) are the remainders after other genera have been separated from the family or the genus *Athyrium* sensu lato. They are somewhat like a “mixed stew”, but not a natural monophyletic group. Some of the subgeneric unites are very active in evolution and with large number of related species, while some others are isolated or unique. There-

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fore, the size of the infrageneric groups are not equal. Presence or absence of folds on perispore surface is an important character for the subgeneric classification. There are more than 300 Chinese *Athyrium* species name published, they have been preliminarily treated as 117 species with a number of varieties and hybrids. They are suggested to be classified into 14 sections and 15 series in present paper.

Key words Taxonomy; Pteridophyte; Athyriaceae; *Athyrium*; China

This genus was included in the *Asplenium* in the early time. *Athyrium* as a genus was defined by A. W. Roth in 1799. But his concept had not been accepted by most taxonomists for more than 60 years. Until 1866, J. Milde confirmed its independent position for the first time. However, Milde's concept was still too broad, which included *Diplazium* Sw. and *Allantodia* R. Br. Like the biological classification of other organism, the concept of the genus *Athyrium* also has a process in cognition, which always is from rough to accurate, from the surface to the essence, and from artificial to near natural along with the accumulation of collections and the increase of our understanding ability. Later on, *Diplazium* was recognized by Diels (1899), Christensen (1905) and other pteridologists. Then, the concept of *Athyrium* was near natural. Modern cytological data further proved that they are based on different basic chromosome numbers, *Asplenium* has $X=36$, *Diplazium* and *Allantodia* have $X=41$, but *Athyrium* has $X=40$ (Bir, 1973; Love et al., 1977). Nevertheless, new evidence shows that the species with same basic chromosome number may not be gathering into a same genus necessarily. After the genera of *Dryothyrium* Ching, *Lunathyrium* Koidz., *Athyriopsis* Ching, *Pseudocystopteris* Ching, *Rhachidosorus* Ching and *Neoathyrium* Ching et Z. R. Wang had been separated from the huge and complex *Athyrium* sensu lato by late Professor Ching and other pteridologists (Ching 1941, 1964, 1978 etc.), the definition of *Athyrium* was getting clear. Ching's concept of *Athyrium* has been widely accepted by most Chinese fern taxonomists. Although there are pteridologists who still do not agree with Ching's opinion today, and even lump the genera of *Anisocampium* Presl, *Kuniwatsukia* Pich. — Serm., *Cystothyrium* Ching, *Dryothyrium* Ching, *Athyriopsis* Ching and *Pseudocystopteris* Ching in *Athyrium* (Kato, 1977, Shieh et al., 1994 etc.). We believe that along with the time going forward and the increasing of the knowledge on the richness and complexity of fern flora of China, the independent position of these genera would be accepted. Present paper will discuss the classification problems of Chinese *Athyrium* under Ching's (1978) genus concept.

Even according to Ching's concept, the genus *Athyrium* sensu stricto is still the largest genus in the family, and one of the largest and extremely difficult fern taxa in taxonomic treatment. Its members widely occur in the world, mainly in the north temperate zone and subtropic mountain area under forest, brush or in meadow. Himalaya—China—Japan area is the center of its geographic distribution. The genus remains complex morphologically. Apart from the common generic features, the taxonomic characters often used are variable and interlock each other, such as sori from rotund, oblong and short linear to curved, J-shaped, hippocrepiform

and reniform; indusiate, indusia caducous or exindusiate; rhizome erect, ascendent or short—repent, long repent and so on. Which shows that this genus may not be monophyletic.

There are more than 350 published Latin name deal with "*Athyrium*" (unpublished manuscript name excluded) and near 300 Chinese name deal with it. They were published in different magazines or books. Some of them are name nude, such as more than 40 nude names were used in the book "*Sporae Pteridophytorum Sinicorum*" (Chang et al., 1976), 94 new species were published in the papers of "New taxa of genus *Athyrium* in China" (Ching & Hsieh, 1986a, b, c) only with Latin diagnosis without figures. Big number, large variation ranges (for instance "ontogenetic variation"), hybrids and polyploids are the primary factors cause their classification difficulty. More than 60 hybrids have been reported in Japan (Nakaike, 1992). "How many hybrids exist in China?" are still waiting for the further cytological studies to answer. All these difficulties make the classification of *Athyrium* fearful, and moving slowly.

Since *Athyrium* is so big, the subdivision of the genus is necessary. However, that is hard to do before all the species have been recognized. Although during our collaboration of undertaking the Chinese *Athyrium* studies for the Flora of China, Hsieh published as his opinion in 1986 that the genus was subdivided into 2 subgenera, 5 sections and 10 series, in which the taxa were named by Ching as the first nominator, and without indicating what species should be included in each infrageneric taxon. Not too long after, Wu & Ching in 1991 again subdivided the genus into 4 sections in name nude, which also were named by Ching as the only nominator. The same nominator has given two different treatments in a short time, which means that the authors are not confident for their treatment. The subdivisions of the genus *Athyrium* has been thrown into confusion.

In my opinion, the genus *Athyrium* sensu stricto has the following nature:

1. The variance range of the taxonomic characters in the genus is so broad that some of them were used as the diagnostic characters of the related genera. Such as "rotund and reniform sori" is found in the genera *Cystopteris*, *Kuniwatsukia*, *Cystoathyrium*, *Dryoathyrium*, *Anisocarpium* and *Pseudocystopteris*, and also in *Athyrium wallichianum*, *A. foliolosum* and *A. drepanopterum*; "exindusiate" occurs in *Gymnocarpium*, *Neathyrium* and *Cornopteris*, and also in *A. wallichianum*; "creeping rhizome" presents in *Anisocarpium* and *Pseudocystopteris*, and also in *A. biserrulatum*, *A. pectinatum* and *A. chingianum* etc. Therefore, the species in *Athyrium* sensu stricto may not be natural monophyletic group, but like a "mixed stew" consist of the remainders after other genera have been separated from the family or the genus *Athyrium* sensu lato.

2. Spore peripore with or without prominent folds is a stable character in the genus, which is often correlated with some other characters. According to presence or absence of perispore folds *Athyrium* can be divided into two distinct groups, and some confused species can be easily recognized. So that, it can be used as an important criteria for the subdivision of the genus.

3. The divergence degree of the infrageneric groups is variable, some of them are active in

evolution with many close related species, some others of them are not so active with only a few species or even only one isolated species. Therefore, the sections or series with different numbers of species are natural. It is not reasonable that we divided the genus into section or series in an equal size artificially or only based on one character (for instance, "rhizome repent" or "costae bearing spine like processes" etc.) without combining other characters.

There are more than 160 *Athyrium* species in the world in estimation. The Chinese *Athyrium* species have been treated as 117 species with a number of varieties and hybrids by the author. They occur in almost all of the provinces in China, The mountain area of the South West China is their geographic center. They are suggested to be classified into 14 sections and 15 series in present paper. The 14th section (Sect. *Otophora*) is the most active group in evolution with many species, and which been divided into 2 subsections. The author will report the taxonomic treatment for the Chinese *Athyrium* in two sections, the subdivision of the genus and the enumeration of the species. This is the first section, the subdivision of the genus.

蹄盖蕨属(*Athyrium*)和其他生物类群的分类一样,随着人们对植物标本的采集积累,以及对自然界认识能力的提高,对其概念的定义经历着一个从粗到细、由表及里和从人为到自然的过程。该属早期一直被包括在大的铁角蕨属(*Asplenium*)内, A. W. Roth 在 1799 年首先建立了这个属,然而,当时并未被普遍接受,六十多年后,直到 1866 年 J. Milde 才首先确认了该属的独立位置,但是, Milde 的概念还很大,包括了双盖蕨属(*Diplazium* Sw.)和短肠蕨属(*Allantodia* R. Br.),后来,一些学者承认了双盖蕨属的独立性(Diels, 1899; Christensen, 1905),蹄盖蕨属的概念才接近合理,近代的细胞学资料也进一步证明它们都具有不同的染色体基数,铁角蕨属的 $X=36$, 双盖蕨属和短肠蕨属的 $X=41$, 而蹄盖蕨属是 $X=40$ (Bir, 1973; Love et al., 1977)。然而,许多新的证据表明,具有相同染色体基数的类群未必都一定是同一个属。随着秦仁昌(1941, 1964, 1978)等学者对蹄盖蕨属的近缘属(如:介蕨属 *Dryoathyrium* Ching、蛾眉蕨属 *Lunathyrium* Koidz.、假蹄盖蕨属 *Athyriopsis* Ching、假冷蕨属 *Pseudocystopteris* Ching、轴果蕨属 *Rhachidosorus* Ching 和新蹄盖蕨属 *Neathyrium* Ching et Z. R. Wang 等)的区分,使得蹄盖蕨属这个庞杂的大属清爽多了,秦的概念已经被中国的蕨类植物分类学家广泛地接受,目前,虽然国外有的学者仍未承认这些从蹄盖蕨中的分出来的属,甚至主张把安蕨属(*Anisocampium*)、拟鳞毛蕨属(*Kuniwatsukia*)、光叶蕨属(*Cystoathyrium*)、介蕨属(*Dryoathyrium*)、假蹄盖蕨属(*Athyriopsis* Ching)和假冷蕨属(*Pseudocystopteris*)等属都归并到蹄盖蕨属(Kato, 1977, Shieh et al., 1994),然而,我们相信,随着时间的推移和对中国丰富的蕨类植物区系复杂性的深入认识,这些属的独立位置是会逐渐被更广泛地接受的。本文采用秦仁昌系统(1978)的定义范围来讨论中国的蹄盖蕨属的分类问题。

即使是按秦仁昌的概念,狭义蹄盖蕨属仍然是蹄盖蕨科中最大的属,也是蕨类植物中分类最困难的大属之一,它分布于世界各地,主产于北温带和亚热带高山林下,或灌丛草甸,中国、喜马拉雅和日本为其分布中心。在形态上仍然很复杂,除了共有的属的特征以外,主要分类性状变化较多,且有时互相交叉,例如:孢子囊群从圆形、椭圆形、短线形到弯钩形、马蹄形或圆肾形;囊群盖有宿存的,也有早消失不易见的;根状茎有直立的、斜升的,也有长横走

或短横卧的;叶柄也有长有短等等。这表明该属可能并非单系起源的。

已发表的、中国产的涉及拉丁名“*Athyrium*”的名称约有 350 多个(不包括标本馆中标本上未发表的手写新种名),涉及中文“蹄盖蕨”的名字也有近 300 个,新种发表的原始文献分散在不同的杂志或书上,有许多新种是以裸名形式出现的,如“中国蕨类植物孢子形态”(张玉龙等,1976)一书中用了 40 多个裸名;有的是仅用无图的简单的拉丁摘要形式发表的,如“中国蹄盖蕨属的新分类群”(秦仁昌,谢寅堂 1986a, b, c)发表的 94 个新种。种类多、种的形态变异(如年龄变异)大,以及杂交多倍体的存在是造成本属分类困难的主要原因,在日本已报道有 60 多个杂种(Nakaïke, 1992),中国究竟有多少杂种还有待进一步的细胞学调查研究。族群的庞大和命名上复杂所造成的困难使人望而生畏,致使本属的分类研究迟迟不前。

面对这样一个大属,属下的次级划分无疑是需要的,然而,在对整个属的种类尚未查清楚之前,属下划分也无法进行。虽然,在本文作者与谢寅堂合作编写中国植物志蹄盖蕨属的过程中,谢(1986)以个人名义发表了以秦仁昌为第一定名人的把该属划分为 2 亚属、5 组、10 系的意见,也没有说明每个组或系包括哪些种,而吴兆洪和秦仁昌(1991)又以裸名形式、以秦仁昌为定名人把该属直接划分为 4 个组,同一个第一定名人在短时间内的不同分类方案,说明其很不成熟,并使该属的亚划分陷入了混乱。作者认为:

1. 本属的分类性状变化很大,有的是蹄盖蕨科中被用来划分属的特征。例如:“孢子囊群圆形或圆肾形”是冷蕨属(*Cystopteris*)、拟鳞毛蕨属(*Kuniwatsukia*)、光叶蕨属(*Cystoathyrium*)、介蕨属(*Dryoathyrium*)、安蕨属(*Anisocarpium*)和假冷蕨属(*Pseudocystopteris*)等属的特征,本属中的黑鳞蹄盖蕨(*A. wallichianum*)、大盖蹄盖蕨(*A. foliolosum*)和多变蹄盖蕨(*A. drepanopterum*)等也是;“孢子囊群无盖”是羽节蕨属(*Gymnocarpium*)、新蹄盖蕨属(*Neoathyrium*)和角蕨属(*Cornopteris*)的特征,本属的黑秆蹄盖蕨(*A. wallichianum*)也无盖;“根状茎横走”是安蕨属(*Anisocarpium*)和假冷蕨(*Pseudocystopteris*)等属的特征,本属的苍山蹄盖蕨(*A. biserrulatum*)、篦齿蹄盖蕨(*A. pectinatum*)和秦氏蹄盖蕨(*A. chingianum*)等的根状茎也横走等等。

因此,本属的组成种并非只是一个单系起源的自然类群,而可以说是由蹄盖蕨科其他属被划分出去以后剩余下来的种类集合而成的“大杂烩”。

2. 孢子周壁表面褶皱的有无在本属是比较稳定的特征,并且和许多其他形态特征相关,根据它可以把本属划分为界线清楚的两群,并较容易地区别一些易混淆的种,在组系划分中占有重要的位置。

3. 本属类群之间的分化程度相差很大,有的群进化活跃,近缘种很多,有的群则种很少,甚至是孤立的种。所以在进行属下划分时,在不同组或系之间种的数量相差悬殊是自然的,如果人为地用近乎等量分割的办法划分,或只根据一个特征(如:“根状茎横走”或“羽轴上面有刺状突起”等),不参考其他特征综合考虑来划分组或系将是不合理的。

本属估计全世界约有 160 多种,中国的种被作者处理为 117 种和一些变种、杂种,以西南高山地区为分布中心,各省区均有。这些种可归纳为 14 个组和 15 个系,第 14 组(刺蹄盖蕨组)进化活跃种类较多,被划分为 2 个亚组。现将中国蹄盖蕨属的分类学处理及正异名(包括中名)详细名录作一报导,鉴于篇幅所限,将分两大部分发表,第一部分是组系划分,第二部分是种及种下的分类学处理。本文是第一部分。

蹄盖蕨属 *Athyrium* Roth

(蹄苞蕨属)

Roth in Rom. Mag. 2(1):105. 1799; et Tent. Fl. Germ. 3:58. 1800; Milde in Bot. Zeit. 1866:373. 1866, pro parte; Ching in Acta Phytotax. Sin. 16(3):12. 1978.

陆生, 中型草本植物。根状茎短, 多为直立, 少有横走或斜升, 罕细长而横走; 叶簇生, 罕近生或远生。叶柄长, 基部往往加粗, 背面隆起腹面凹陷, 两侧边缘有瘤状气囊体各一行, 向下变为尖削, 少为圆柱形, 有时无气囊体, 向下不尖削; 横切面有 2 条维管束, 呈八字形排列, 向叶轴连合呈 U 字形; 叶柄基部被鳞片, 鳞片红棕色、褐棕色或黑褐色, 卵状披针形、长钻形或线状披针形, 全缘, 由厚壁的狭长细胞构成, 膜质, 基部着生; 叶柄上面有 1 条纵沟, 向上直通叶轴, 沟内往往被短腺毛; 叶片卵形、长圆形或阔披针形, 一回至三回羽状, 各回羽片基部合生或分离, 通常以锐角沿各回羽轴下面圆形, 上面有 1 条深纵沟, 两侧边缘呈刀口状的隆起, 但与其上一回羽轴(或主脉)汇合处有 1 断裂缺口, 彼此互通, 其下无或有 1 个肉质的刺状凸起。叶脉分离, 叉状或羽状, 小脉伸达锯齿顶端。叶干后常为草质, 少为纸质或革质, 两面通常光滑, 罕被鳞片或毛, 唯叶轴、羽轴和小羽轴(或主脉)上往往被有短腺毛。孢子囊群圆形、圆肾形、马蹄形、弯勾形、长圆形或短线形, 背生、侧生或横跨小脉上; 囊群盖圆肾形、马蹄形、弯勾形、新月形、长圆形或短线形, 棕色, 膜质, 边缘啮蚀状或有睫毛, 少为全缘, 通常宿存, 罕无囊群盖或囊群盖不发育。孢子两面型, 极面观为椭圆形, 赤道面观为豆形, 周壁表面具褶皱或无褶皱。染色体基数 $X=40$ 。

Type of the genus 属的模式: 蹄盖蕨 *Athyrium filix femina* (L.) Roth

Key to the sections and series

1. Spores perispore with prominent folds.
 2. Exindusiate or indusia caducous.
 3. Sori rotund or elliptic; petiole and rachis dark brown, bearing throughout dense dark castaneous brown or black, ovate lanceolate scales and mixed with fibrous ones; basal pinnae tapering towards the base; petiole far shorter than lamina; pinna apex obtus (species 1). Sichuan, Northeast Yunnan and Southeast Xizang; Nepal, Sikkim, Bhutan, India, North Burma, North Pakistan and Kashmirian Sect. 1. **Wallichiana** (X. C. Zhang) Z. R. Wang
 3. Sori elliptic, straight, curved, hippocrepiform or reniform; petiole and rachis stramineous or pale purplish red, only at the base bearing many brown scales; basal pinnae only 1 ~ 2 pairs slightly shortened; petiole a little shorter than lamina; pinna apex acuminate (species 2 ~ 3). Hunan, Guangxi, Sichuan, Guizhou, Yunnan and Xizang; Nepal, North India, Burma, Viet Nam and Thailand Sect. 2. **Dissitifolia** (X. C. Zhang) Z. R. Wang
 2. Indusia persistent, rarely incomplete but visible, at least when tender.
 4. Rhizome long or short creeping with distant or approximate fronds, or erect; pinnae sessile and not auriculate at the acroscopic bases.
 5. Costae and costules bearing prominent spine like processes adaxially (species 4). Southeast Xizang; India, Nepal and Sikkim Sect. 3. **Pectinata** (Ching et Y. T. Hsieh) Z. R. Wang
 5. Costae and costules bearing no processes adaxially (species 5 ~ 7). From Northeast China to Xizang; Japan, Korea, Himalaya area, Viet Nam and Burma Sect. 4. **Niponica** Ching et Y. T. Hsieh
 6. Rhizome slender repent, fronds distant. Sichuan, Yunnan, Southeast Xizang, Sikkim, Bhutan,

Nepal, India, Pakistan and Burma Ser. 1. **Biserrulata** Ching et Y. T. Hsieh

6. Rhizome short creeping with approximate fronds (occasionally long underground creeping), or erect with caespitose fronds.

7. Laminae ovate to oblong apex cuspidate, basal pinnae only 1~2 pairs a little shortened, pinnae stipitate; petiole a little shorter than lamina bearing pale brown scales at the base; sori elongated, oblong or J-shaped (species 8~9). Liaoning, Beijing, Hebei, Shanxi, Shaanxi, Gansu, Ningxia, Anhui, Taiwan, Zhejiang, Jiangxi, Shandong, Henan, Hunan, Guangxi, Sichuan, Guizhou and Yunnan; Japan, Korea, Nepal, Viet Nam and Burma

..... Ser. 2. **Niponica** Ching et Y. T. Hsieh emend. Z. R. Wang

7. Laminae lanceolate, oblong lanceolate or oblanceolate, apex acuminate, pinnae sessile or extremely shortly stipitate (less than 5mm long); petiole far shorter than lamina, bearing redish brown or castaneous scales at the base; sori subround, elliptic reniform, hooked or hippocrepiform.

8. Indusia pallid, margin ciliated; lamina tapering towards a very narrow base; rhizome short creeping. (species 10~12). Northeast China, North China and Shaanxi, Gansu, Ningxia, Henan, Hubei, Sichuan, Yunnan, Southeast Xizang, Korea, Japan, Nepal, Sikkim, Bhutan, Kashmir, India and North Pakistan

8. Indusia pale brown, entire; basal pinnae not or slightly shortened; rhizome near erect (species 13~14). Liaoning, Henan, Shandong, Jiangsu, Zhejiang, Anhui, Hunan, Jiangxi, Sichuan and Guizhou; Korea and Japan Ser. 4. **Yokoscentia** Z. R. Wang

4. Rhizome erect, fronds caespitose, pinnae usually stipitate and auriculate at the acroscopic bases, pinnules anadromic. (species 15~22). Jiangxi, Hunan, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Southeast Xizang and Taiwan; Japan, Bhutan, Nepal, Sikkim, North India, Burma, Viet Nam, Thailand, Malaysia, Sri Lanka, Indonesia and The Philippines

..... Sect. 5. **Polystichoides** Ching et Y. T. Hsieh emend. Z. R. Wang

1. Spore perispore without folds.

9. Rhizome slender repent, fronds distant. Yunnan

..... Sect. 14, Subject. 2, Ser. 2. **Fangiana** Z. R. Wang
(species 100. *A. chingianum* Z. R. Wang et X. C. Zhang)

9. Rhizome erect, fronds caespitose.

10. Costae or costules, or second costules without spine like processes adaxially (at most in big plants costae occasionally bearing very short prominence).

11. Pinnae broadened, asymmetrical at the base, auriculate at thier acroscopic bases, cuneate at basiscop-ic bases; pinnuls or lobes anadromic; costae never bearing prominence adaxially; plant small, fertile fronds less than 10cm long. (species 23). Taiwan

11. Pinnae narrowed, broadened or slightly broadened, symmetric or subsymmetric at the base; at least pinnules or lobes of supra medial pinnae catadromic or opposite; in big plants costae bearing very short prominence adaxially; plant middling, fertile fronds usually more than 10cm long.

12. Lamina densely pubescent (species 24~25). Sichuan

..... Sect. 7. **Suprapubescentia** Z. R. Wang

12. Lamina glabrous.

13. Basal pinnae notaly constricted at bases; sori often short linear; rachis and costae glabrous or glandular pubescent abaxially.

14. Laminae deltoid ovate, apex cuspidate, basal several pair of pinnae subopposite, the basiscopic

- lobes longer than the acroscopic ones at the lowest pair of pinnae (species 26). Hainan ...
 Sect. 8. **Hainanensia** Z. R. Wang
14. Laminae lanceolate or ovate oblong, apex acuminate, pinnae alternate, the basiscopic lobes almost equal to the acroscopic ones at the lowest pair of pinnae (species 27 ~ 28). North Guangxi, South Guizhou and Southeast Yunnan Sect. 9. **Pachyphylla** Z. R. Wang
13. Basal pinnae slightly broadened or slightly narrowed at bases; sori mostly reniform, hippocrepiform, J— shaped or oblong; rachis and costae sparsely squarrose glandular pubescent abaxially (species 29 ~ 39). From Northeast China to Xizang; The temperate zone of north hemisphere
 Sect. 10. **Athyrium**
10. Costae or costules, or even second costules bearing long or short spine like processes adaxially.
15. Laminae pinnate, oblanceolate, pinnae shallowly to deeply lobed, basal few pairs of pinnae tapering towards the base, basal pair of pinnae often reduced to auriculate (species 40). Southeast Xizang and Yunnan; Sikkim Sect. 11. **Stenopoda** Z. R. Wang
15. Laminae pinnate to tripinnate, not oblanceolate, basal pinnae not tapering, at most only a few pairs of pinnae slightly shortened, but never reduced to auriculate.
16. Laminae narrowly lanceolate, pinnae more than 20 ~ 25 pairs (species 41 ~ 42). Zhejiang, Hunan, Jiangxi, North Guangxi and Guizhou Sect. 12. **Multipinna** Z. R. Wang
16. Laminae broader, not narrowly lanceolate, pinnae less than 20 ~ 25 pairs.
17. Indusia J— shaped, hippocrepiform, reniform, elliptic or short linear, lateral, acrossing or dorsifixed on veinlets; scales at petiole base yellowish brown, brown or dark brown. The south of China from Qinling; Japan, Korea, Sikkim, Nepal, North India, Viet Nam, Burma, Thailand, Pakistan, Afghanistan, Himalaya area and The Philippines
 Sect. 13. **Mackinnonian** (Ching et Y. T. Hsieh) Z. R. Wang
18. Pinnules or lobes of supra medial pinnae anadromic, occasionally catadromic or subopposite, rachis and costae stramineous, occasionally pale purplish red, glabrous or pubescent abaxially; the narrow wing margin of costae or the sinus between lobes glabrous (species 43 ~ 51). Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan; Japan, Korea and The Philippines Ser. 1. **Devolian** Z. R. Wang
18. Pinnules or lobes of supra medial pinnae catadromic or subopposite; rachis and costae usually pale purplish red, rarely stramineous, pubescent abaxially; the narrow wing margin of costae or the sinus between lobes pubescent or glabrous.
19. Indusia usually reniform, oval or elliptic; laminae broad ovate, the basal pair of pinnae biggest, apex acuminate; scales yellowish brown (species 52). Hubei, Hunan, Sichuan, Yunnan, Shaanxi and Southeast Gansu Ser. 2. **Omeiensia** Z. R. Wang
19. Indusia usually oblong, J— shaped or hippocrepiform; laminae usually oblong ovate, apex cuspidate or acuminate, the basal pair of pinnae equal to or a little bigger than the next pair; scales brown or dark brown.
20. Pinnae prominently stipitate (usually more than 2 mm long), alternate, except basal pair subopposite; the narrow wing margins of costae or the sinus between lobes glabrous, rarely pubescent sparsely; indusium margin subentire or erose (species 53 ~ 59). Shaanxi, Gansu, Henan, Anhui, Jiangxi, Zhejiang, Fujian, Taiwan, Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunnan and Xizang; Japan, Korea, Nepal, Sikkim, Viet Nam, Bur-

- ma, Thailand, North India, Pakistan and Afghanistan Ser. 3. **Mackinnonianiana** Z. R. Wang
20. Pinnae sessile, rarely shortly stipitate (less than 2 mm long), more than 3 basal pairs often opposite or subopposite; the narrow wing margins of costae or the sinus between lobes more or less pubescent, rarely glabrous; indusium margin usually ciliated, seldom lacerate or erose (species 60~74). West Sichuan, Yunnan and Xizang; Sikkim, Nepal, North India and Himalaya area Ser. 5. **Dubia** Z. R. Wang
17. Indusia short linear or oblong, straight, lateral on veinlets, close to the costules, occasionally curved in lamina apex or suprabasal lobes of pinnules; scales usually black or black brown. The south of China from Qinling; Japan, Korea, Nepal, Sikkim, Bhutan, India, Burma, North Viet Nam, Sri Lanka and India Sect. 14. **Otophora** Z. R. Wang
21. Processes short subuliform on adaxial costae, no processes on costules and second costules, occasionally bearing but extremely short. The south of China from Qinling; Japan, Korea, India, Viet Nam and Burma Subsect. 1. **Otophora** Z. R. Wang
22. Laminae broad ovate or ovate, apex often cuspidate, sometimes ovate short acuminate; pinnae usually prominently stipitate (stipes usually more than 2~3 mm long) (species 75~82). Shaanxi, Anhui, Zhejiang, Taiwan, Hubei, Hunan, Fujian, Jiangxi, Guangdong, Guangxi, Sichuan and Guizhou; Japan and Korea Ser. 1. **Wardiana** Z. R. Wang
22. Laminae oblong ovate or lanceolate, sometimes ovate, apex acuminate, rarely cuspidate; pinnae usually sessile, or extremely short stipitate (stipes less than 2 mm long).
23. Pinnules or lobes obtuse or truncate, margin lobate or crenate; sori usually close to lobe margin (species 83). Southwest Guangxi and Southeast Yunnan; Viet Nam Ser. 2. **Christenseniana** Z. R. Wang
23. Pinnules or lobes acute or obtuse, margin not crenate; sori usually close to costule (species 84~96). Anhui, Zhejiang, Fujian, Hubei, Hunan, Guangxi, Guangdong, Sichuan, Guizhou, Yunnan and Taiwan; Japan, India and Burma Ser. 3. **Otophora** Z. R. Wang
21. Processes on costae usually long spine like, costules or second costules often bearing processes too. Yangtse valley, Southwest China, East China and South China, Xizang and Taiwan; Nepal, Sikkim, Bhutan, India, Burma, North Viet Nam, Sri Lanka, Japan and South Korea Subsect. 2. **Strigilosa** (Ching et Y. T. Hsieh) Z. R. Wang
24. Laminae tripinnate or more divided; secondary pinnules prominently stipitate; rachis and costae glabrous abaxially (species 97~99). Sichuan, Yunnan and Xizang; North Burma Ser. 1. **Rhachidosora** Z. R. Wang
24. Laminae pinnate to bipinnate; pinnules at most pinnatifid; rachis and costae pubescent or glabrous abaxially.
25. Sori straight, oblong or short linear, close to costae or costules, often overlap them when ripe; rachis and costae glabrous abaxially, at most at the bases of costae slightly pubescent (species 100~106). Sichuan, Yunnan and Southeast Xizang; Burma, Nepal, India and Bhutan Ser. 2. **Fangiana** Z. R. Wang
25. Sori curved or straight, not close to costae or costules, not overlap them when ripe; rachis and costae pubescent, rarely glabrous abaxially.
26. Lamina lanceolate to linear lanceolate; pinnae usually more than 18 pairs; rachis below the apex usually bearing 1 or 2 bulblets, occasionally not (species 107~109). Jiangxi, Hunan, Guang-

- dong, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan; Sikkim, India, Nepal, Burma and Japan Ser. 3. **Strigillosa** Z. R. Wang
26. Lamina broad ovate, ovate or lanceolate; pinna less than 15 pairs; rachis below the apex usually no bulblets, occasionally bearing (species 110~117). Hubei, Hunan, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan; India, Sri Lanka, North Viet Nam, Japan and South Korea ... Ser. 4. **Iscana** Z. R. Wang

分组、分系检索表

1. 孢子周壁表面有明显的褶皱。
2. 囊群无盖或盖早消失不易见。
3. 孢子囊群圆形或椭圆形; 叶柄及叶轴暗褐色, 密被栗黑色或褐棕色、卵状披针形和线形两种混生的鳞片; 叶下部羽片多对逐渐缩短, 羽片钝头; 叶柄远较叶片短(种 1)。产四川、云南西北部 and 西藏东南部; 国外分布于尼泊尔、锡金、不丹、印度、缅甸北部、巴基斯坦北部和克什米尔地区 组 1. 黑秆蹄盖蕨组 Sect. 1. **Wallichiana** (X. C. Zhang) Z. R. Wang
3. 孢子囊群椭圆、弯钩、马蹄或圆肾等形状; 叶柄及叶轴禾秆色或略带淡紫红色, 仅在叶柄基部被有较多棕色鳞片; 叶下部羽片仅 1~2 对稍缩短, 羽片渐尖头; 叶柄仅稍短于叶片(种 2~3)。产湖南、广西、四川、贵州、云南和西藏; 国外分布于尼泊尔、印度北部、缅甸、越南和泰国 组 2. 疏叶蹄盖蕨组 Sect. 2. **Dissitifolia** (X. C. Zhang) Z. R. Wang
2. 囊群盖宿存, 少有残存能见, 或至少幼嫩时可见。
4. 根状茎细长横走或短横卧, 叶远生或近生, 或近直立, 但羽片无柄, 基部上侧不呈耳状。
5. 羽轴及小羽片中肋上面有长针刺状突起(种 4)。产西藏东南部; 国外分布于印度、尼泊尔和锡金 组 3. 篦齿蹄盖蕨组 Sect. 3. **Pectinata** (Ching et Y. T. Hsieh) Z. R. Wang
5. 羽轴及小羽片中肋上面无刺状突起。产东北至西藏; 国外分布于日本、朝鲜、喜马拉雅地区及越南和缅甸 组 4. 日本蹄盖蕨组 Sect. 4. **Niponica** Ching et Y. T. Hsieh
6. 根状茎细长横走, 叶远生(种 5~7)。产四川、云南中部和西北部、西藏东南部; 国外分布于锡金、不丹、尼泊尔、印度、巴基斯坦和缅甸 系 1. 苍山蹄盖蕨系 Ser. 1. **Biserrulata** Ching et Y. T. Hsieh
6. 根状茎短横卧叶近生(偶兼有细长地下匍匐茎), 或近直立叶簇生。
7. 叶片卵形至长卵形, 顶部急缩, 下部羽片仅 1~2 对稍缩短, 羽片有柄, 叶柄仅稍短于叶片; 叶柄基部鳞片淡棕色; 孢子囊群短线形、长圆形或长弯钩形(种 8~9)。产辽宁、北京、河北、山西、陕西、甘肃、宁夏、安徽、台湾、浙江、江西、山东、河南、湖南、广西、四川、贵州和云南等省区; 国外分布于日本、朝鲜、尼泊尔、越南和缅甸 系 2. 日本蹄盖蕨系 Ser. 2. **Niponica** Ching et Y. T. Hsieh emend. Z. R. Wang
7. 叶片披针形、长圆状披针形或倒披针形, 顶部渐尖, 羽片无柄或偶有极短柄(不超过 5mm); 叶柄远较叶片短; 叶柄基部鳞片红棕色或栗色; 孢子囊群近圆形、椭圆形、圆肾形、短弯钩或马蹄形。
8. 囊群盖灰白色, 边缘具睫毛, 叶基部羽片多对逐渐缩短, 根状茎短横卧(种 10~12)。产东北、华北及陕西、甘肃、宁夏、河南、湖北、四川、云南和西藏东南部; 国外分布于朝鲜、日本、尼泊尔、锡金、不丹、克什米尔、印度和巴基斯坦北部 系 3. 麦秆蹄盖蕨系 Ser. 3. **Fallaciosa** Z. R. Wang
8. 囊群盖淡棕色, 全缘, 叶基部羽片不缩短或几不缩短, 根状茎近直立(种 13~14)。产辽宁、河南、山东、江苏、浙江、安徽、湖南、江西、四川和贵州; 国外分布于朝鲜和日本 系 4. 禾秆蹄盖蕨系 Ser. 4. **Yokoscentia** Z. R. Wang

4. 根状茎直立, 叶簇生, 羽片通常有短柄, 基部上侧呈耳状, 小羽片上先出(种 15~22)。产江西、湖南、广东、广西、四川、贵州、云南、西藏东南部和台湾; 国外分布于日本、不丹、尼泊尔、锡金、印度北部、缅甸、越南、泰国、马来西亚、斯里兰卡、印度尼西亚和菲律宾 组 5. 耳状蹄盖蕨组 Sect. 6. *Polystichoides* Ching et Y. T. Hsieh
1. 孢子周壁表面无褶皱。
9. 根状茎细长横走, 叶远生。产云南 组 14., 亚组 2., 系 2. 方氏蹄盖蕨系 Sect. 14, Subsect. 2, Ser. 2. *Fangiana* Z. R. Wang (种 100. 秦氏蹄盖蕨 *A. chingianum* Z. R. Wang et X. C. Zhang)
9. 根状茎直立, 叶簇生。
10. 羽轴或小羽轴或中肋上面无刺状突起(至多在大型植株羽轴顶部偶有极短突起)。
11. 羽片基部明显增宽, 不对称, 上侧增大呈耳形, 下侧通常楔形; 叶片若为一回羽状以上分裂, 其裂片或小羽片均为上先出; 羽轴上面从无刺状突起; 小型植物, 能育叶长不逾 10cm(种 23)。特产台湾 组 6. 小蹄盖蕨组 Sect. 5. *Minima* Z. R. Wang
11. 羽片基部收缩、不变宽或稍增宽, 对称或近对称; 至少中部以上羽片的小羽片或裂片下先出或对生; 大型植株的羽轴上面偶有极短突起; 中型植物, 能育叶长在 10cm 以上。
12. 叶片上面密被短毛(种 24~25)。特产四川 组 7. 毛叶蹄盖蕨组 Sect. 7. *Suprapubescentia* Z. R. Wang
12. 叶片上面不密被短毛。
13. 叶片下部羽片的基部明显收缩; 孢子囊群多为短线形; 叶轴和羽轴下无毛或被短直腺毛。
14. 叶片三角状卵形, 顶端急缩, 下部数对羽片近对生, 基部一对羽片的羽轴下侧裂片较上侧的长(种 26)。特产海南 组 8. 海南蹄盖蕨组 Sect. 8. *Hainanensia* Z. R. Wang
14. 叶片披针形或卵状长圆形, 顶端渐尖, 羽片互生, 基部一对羽片的羽轴上下两侧裂片近等长(种 27~28)。产广西北部、贵州南部和云南东南部 组 9. 裸囊蹄盖蕨组 Sect. 9. *Pachyphylla* Z. R. Wang
13. 叶片下部羽片的基稍宽或稍有收缩; 孢子囊群多为圆肾形、马蹄形、弯钩或长圆形; 叶轴和羽轴下面疏被棘头状短腺毛(种 29~39)。产东北至西藏; 国外分布于北半球温带 组 10. 蹄盖蕨组 Sect. 10. *Athyrium*
10. 羽轴或连同小羽轴、中肋上面或长或短具有刺状突起。
15. 叶片一回羽状, 倒披针形, 羽片浅裂至深裂, 下部羽片多对逐渐缩短, 基部一对羽片往往缩短呈耳形(种 40)。产西藏东南部和云南; 国外分布于锡金 组 11. 狭基蹄盖蕨组 Sect. 11. *Stenopoda* Z. R. Wang
15. 叶片一至三回羽状, 不为倒披针形, 下部羽片不缩短, 或至多一至数对稍缩短, 基部一对羽片从不缩短成耳形。
16. 叶片狭披针形, 羽片在 20~25 对以上(种 41~42)。产浙江、湖南、江西、广西北部和贵州 组 12. 多羽蹄盖蕨组 Sect. 12. *Multipinna* Z. R. Wang
16. 叶片较阔, 不为狭披针形, 羽片在 20~25 对以下。
17. 囊群呈弯钩、马蹄、圆肾、椭圆、短线等多种形状, 侧生、横跨或背生于叶脉上; 叶柄基部鳞片常为黄棕色、棕色或深棕色。产秦岭以南各省区; 国外分布于日本、朝鲜、锡金、尼泊尔、印度北部、越南、缅甸、泰国、巴基斯坦、阿富汗和喜马拉雅其他地区以及菲律宾 组 13. 川滇蹄盖蕨组 Sect. 13. *Mackinnoniana* (Ching et Y. T. Hsieh) Z. R. Wang
18. 叶中部以上羽片之小羽片或羽裂片上先出, 偶下先出或近对生, 叶轴及羽轴禾秆色, 偶有带淡紫红色, 下面无毛或具极疏毛; 羽轴两侧狭翅边缘或羽裂片间缺刻处无毛(种 43~51)。产浙江、福建、江西、湖南、广西、四川、贵州、云南、西藏和台湾; 国外分布于日本、朝鲜和菲

- 律宾 系 1. 湿生蹄盖蕨系 Ser. 1. **Devoliana** Z. R. Wang
18. 叶中部以上羽片之小羽片或羽裂片下先出或近对生；叶轴及羽轴通常带淡紫红色，少有禾秆色，下面有毛；羽轴两侧狭翅边缘或羽裂片间缺刻处有毛或无毛。
19. 囊群盖通常为肾形、圆肾或椭圆形；叶片阔卵形，基部一对羽片最大，顶部渐尖；鳞片黄棕色（种 52）。产湖北、湖南、四川、云南、陕西和甘肃东南部 系 2. 峨嵋蹄盖蕨系 Ser. 2. **Omeiensia** Z. R. Wang
19. 囊群盖通常为长圆、弯钩或马蹄形；叶片通常为长圆状卵形，顶部急缩或渐尖，基部一对羽片和第二对羽片近等大或稍大；鳞片棕色或褐棕色。
20. 羽片有明显的柄，长一般在 2mm 以上，除基部一对近对生以外，皆为互生；羽轴两侧狭翅边缘或羽裂片间缺刻处无毛，罕有毛；囊群盖边缘近全缘或啮蚀状（种 53~59）。产陕西、甘肃、河南、安徽、江西、浙江、福建、台湾、湖北、湖南、广西、四川、贵州、云南和西藏；国外分布于日本、朝鲜、尼泊尔、锡金、越南、缅甸、泰国、印度北部、巴基斯坦和阿富汗 系 3. 川滇蹄盖蕨系 Ser. 3. **Mackinnonian**a Z. R. Wang
20. 羽片通常无柄，少有极短柄，长也在 2mm 以内，基部 3 对以上往往对生或近对生；羽轴两侧狭翅边缘或羽裂片间缺刻处通常有毛，少无毛；囊群盖边缘通常睫毛状，少有撕裂或啮蚀（种 60~74）。产四川西部、云南和西藏；国外分布于锡金、尼泊尔、印度北部和喜马拉雅其他地区 系 4. 毛翼蹄盖蕨系 Ser. 5. **Dubia** Z. R. Wang
17. 囊群盖通常为短线形或长圆形，通直，侧生于叶脉上，常靠近中肋，至多在叶片顶部或小羽片基部上侧偶有弯弓；叶柄基部鳞片常为黑色或黑褐色。产秦岭以南各省区；国外分布于日本、朝鲜、尼泊尔、锡金、不丹、印度、缅甸、越南北部、斯里兰卡和印度 组 14. 刺蹄盖蕨组 Sect. 14. **Otophora** Z. R. Wang
21. 羽轴上面的刺状突起钻形，较短，小羽轴或中肋上面无刺状突起，偶有也很短。产秦岭以南各省区；国外分布于日本、朝鲜、印度、越南和缅甸 亚组 1. 刺蹄盖蕨亚组 Subsect. 1. **Otophora** Z. R. Wang
22. 叶片阔卵形或卵形，先端往往急缩，少为长卵形，先端短渐尖；羽片通常有明显的柄（一般在 2~3mm 以上）（种 75~82）。产陕西、安徽、浙江、台湾、湖北、湖南、福建、江西、广东、广西、四川和贵州；国外分布于日本和朝鲜 系 1. 华中蹄盖蕨系 Ser. 1. **Wardiana** Z. R. Wang
22. 叶片长圆状卵形或披针形，少有卵形，先端渐尖，少有急缩；羽片通常无柄，或有极短柄（长不及 2mm）。
23. 小羽片或裂片圆钝头或截头，边缘有圆形浅裂片或波状齿；中肋两边囊群之间的间隔通常宽于囊群到裂片边缘的距离（种 83）。产广西西南部和云南东南部；国外分布于越南 系 2. 中越蹄盖蕨系 Ser. 2. **Christenseniana** Z. R. Wang
23. 小羽片或裂片尖头或钝尖头，边缘裂片或锯齿不为圆形波状；中肋两边囊群之间的间隔通常窄于囊群到裂片边缘的距离（种 84~96）。产安徽、浙江、福建、湖北、湖南、广西、广东、四川、贵州、云南和台湾；国外分布于日本、印度和缅甸 系 3. 刺蹄盖蕨系 Ser. 3. **Otophora** Z. R. Wang
21. 羽轴和小羽轴上面照例有长针形刺状突起，在末回裂片中肋上面也常有刺状突起。产长江流域、西南、华东、华南、西藏和台湾；国外分布于尼泊尔、锡金、不丹、印度、缅甸、越南北部、斯里兰卡、日本和朝鲜南部 亚组 2. 软刺蹄盖蕨亚组 Subsect. 2. **Strigilosa** (Ching et Y. T. Hsieh) Z. R. Wang
24. 叶片可达三回羽状以上；二回小羽片有明显的柄；叶轴和羽轴下面无毛（种 97~99）。产四川、云南和西藏；国外分布于缅甸北部 系 1. 轴生蹄盖蕨系 Ser. 1. **Rhachidosora** Z. R. Wang
24. 叶片 1~2 回羽状；小羽片至多羽裂；叶轴和羽轴下面有毛或无毛。

25. 孢子囊群长圆形或短线形, 通直, 贴近小羽片或裂片的中肋着生, 成熟时往往部分覆盖其上; 叶轴及羽轴下面无毛, 至多在羽轴基部稍有微毛(种 100~106)。产四川、云南和西藏东南部; 国外分布于缅甸、尼泊尔、印度和不丹

..... 系 2. 方氏蹄盖蕨系 Ser. 2. **Fangiana** Z. R. Wang

25. 孢子囊群弯弓或通直, 不贴近小羽片或裂片的中肋着生, 成熟时不覆盖其上; 叶轴及羽轴下面被短毛, 罕无毛。

26. 叶片披针形至线状披针形; 分离羽片通常在 18 对以上; 叶轴近顶部通常有芽胞, 偶无(种 107~109)。产江西、湖南、广东、广西、四川、贵州、云南、西藏和台湾; 国外分布于锡金、印度、尼泊尔、缅甸和日本

..... 系 3. 软刺蹄盖蕨系 Ser. 3. **Strigilosa** Z. R. Wang

26. 叶片阔卵形、卵形或披针形; 分离羽片不超过 15 对; 叶轴近顶部通常无芽胞, 偶有(种 110~117)。产湖北、湖南、江苏、浙江、安徽、福建、江西、广东、广西、四川、贵州、云南、西藏和台湾; 国外分布于印度、斯里兰卡、越南北部、日本和朝鲜南部

..... 系 4. 长江蹄盖蕨系 Ser. 4. **Iseana** Z. R. Wang

组 1. 黑秆蹄盖蕨组 Sect. 1. **Wallichiana** (X. C. Zhang) Z. R. Wang, stat. nov. — Ser. *Wallichiana* X. C. Zhang in Acta Phytotax. Sin. 30(3):247. 1992.

Spore perispore with folds; sori rotund or elliptic, dorsifixed on a veinlet; exindusiate; laminae oblanceolate; petiole and rachis dark brown, densely bearing black castaneous or dark brown, ovato lanceolate scales and mixed with fibrous ones; basal pinnae tapering towards the base, pinnae obtuse; petiole far shorter than lamina. Sichuan, Northeast Yunnan and Southeast Xizang; Nepal, Sikkim, Bhutan, India, North Burma, North Pakistan and Kashmirian.

孢子周壁表面有褶皱; 孢子囊群圆形或椭圆形, 背生于小脉上, 无盖; 叶片倒披针形; 叶柄及叶轴暗褐色, 密被栗黑色或褐棕色、卵状披针形和线形两种混生的鳞片; 叶下部羽片多对逐渐缩短, 羽片钝头; 叶柄远较叶片短。产四川、云南西北部和西藏东南部; 国外分布于尼泊尔、锡金、不丹、印度、缅甸北部、巴基斯坦北部和克什米尔地区。

Type of the section: 黑秆蹄盖蕨 **Athyrium wallichianum** Ching

Species: 本组只有 1 种。黑秆蹄盖蕨 *A. wallichianum* Ching

组 2. 疏叶蹄盖蕨组 Sect. 2. **Dissitifolia** (X. C. Zhang) Z. R. Wang, stat. nov. — Ser. *Dissitifolia* X. C. Zhang in Acta Phytotax. Sin. 30(3):246. 1992. — Ser. *Exindusia*-*ta* Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4):131. 1986, pro parte.

Spore perispore with folds; sori rotund, elliptic, J-shaped or hippocrepiform; exindusiate; petiole and rachis stramineous or slightly pale purplish red, only at petiole bases densely bearing brown scales; basal pinnae only 1~2 pairs slightly shortened, pinnae acuminate; petiole only slightly shorter than lamina. Hunan, Guangxi, Sichuan, Guizhou, Yunnan and Xizang; Nepal, North India, Burma, Viet Nam and Thailand.

孢子周壁表面有褶皱; 孢子囊群圆形、椭圆形、弯钩形或马蹄形, 无盖; 叶柄及叶轴禾秆色或略带淡紫红色, 仅在叶柄基部被有较多棕色鳞片; 叶下部羽片仅 1~2 对稍缩短, 羽片渐尖头; 叶柄仅稍短于叶片。产湖南、广西、四川、贵州、云南和西藏; 国外分布于尼泊尔、印度北部、缅甸、越南和泰国。

Type of the section: 疏叶蹄盖蕨 **Athyrium dissitifolium** (Bak.) C. Chr.

Species: 本组有 2 种。疏叶蹄盖蕨 *A. dissitifolium* (Bak.) C. Chr., 无盖蹄盖蕨 *A. exindusiatum* Ching

组 3. 篦齿蹄盖蕨组 Sect. 3. **Pectinata** (Ching et Hsieh) Z. R. Wang, stat. nov. — Ser. *Pectinata* Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4):133. 1986.

Spore perispore with folds; sori elliptic; indusia oblong, persistent; rhizome long creeping, fronds distant; long spine like processes borne on adaxial surface of costae and costules. Southeast Xizang; India, Nepal and Sikkim.

孢子周壁表面有褶皱; 孢子囊群椭圆形; 囊群盖长圆形, 宿存; 根状茎细长横走, 叶远生; 羽轴及小羽片中肋上面有长针刺状突起。产西藏东南部; 国外分布于印度、尼泊尔和锡金。

Type of the section: 篦齿蹄盖蕨 *Athyrium pectinatum* (Wall. ex Mett.) Moore

Species: 本组只有一种。篦齿蹄盖蕨 *A. pectinatum* (Wall. ex Mett.) Moore

组 4. 日本蹄盖蕨组 Sect. 4. **Niponica** Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4):131. 1986.

Spores perispore with to folds; sori elliptic, short linear, J—shaped, hippocrepiform or reniform; indusia pale brown or pallid, persistent; rhizome usually long creeping or short prostrate; fronds distant or approximate; costae and costules without spine like processes adaxially. From Northeast China to Xizang; Japan, Korea, Himalaya area, Viet Nam and Burma.

孢子周壁表面有褶皱; 孢子囊群椭圆、短线、弯钩、马蹄或圆肾等形状; 囊群盖灰棕色或灰白色, 宿存; 根状茎通常细长横走或短横卧; 叶远生或近生; 羽轴及小羽片中肋上面无刺状突起。东北至西藏; 国外分布于日本、朝鲜、喜马拉雅地区、越南和缅甸。

Type of the section: 日本蹄盖蕨 *Athyrium niponicum* (Mett.) Hance

Four series included. 本组有 4 系。

系 1. 苍山蹄盖蕨系 Ser. 1. **Biserrulata** Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4):132. 1986. — Sect. *Ophiorrhiza* Ching apud S. H. Wu et R. C. Ching, Fern Fam. Gen. China. 280~281. 1991, nom. nud. inval.

Sori oblong, J—shaped or hippocrepiform; indusia pallid, ciliated; rhizome long creeping, densely bearing pale brown lanceolate scales; fronds distant. Sichuan, Yunnan, Southeast Xizang; Sikkim, Bhutan, Nepal, India, Pakistan and Burma.

孢子囊群长圆、弯钩或马蹄形; 囊群盖灰白色, 边缘睫毛状; 根状茎细长横走, 密被淡棕色披针形鳞片; 叶远生。产四川、云南中部和西北部、西藏东南部; 国外分布于锡金、不丹、尼泊尔、印度、巴基斯坦和缅甸。

Type of the series: 苍山蹄盖蕨 *Athyrium biserrulatum* Christ

Species: 本系有 3 种。苍山蹄盖蕨 *A. biserrulatum* Christ, 乌蒙山蹄盖蕨 *A. wu-monshanicum* Ching, 瑞丽蹄盖蕨 *A. ruilicolum* W. M. Chu

系 2. 日本蹄盖蕨系 Ser. 2. **Niponica** Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4):131. 1986. emend.

Sori breviter lineares, oblongi vel J—formes; indusia pallide brunnea, suberosa; rhizoma breviter prostratum; frondes approximatae; laminae ovatae ad anguste ovatae, apice cuspidatae, pinnae stipitatae, basales 1~2—jugae tantum paullo abbreviatae; petioli laminis paullo

breviores; basi paleis brunneolis.

Sori short linear, oblong or long J-shaped; indusia pale brown, suberose; rhizome short prostrate; fronds approximate; laminae ovate to narrow ovate, apex cuspidate, basal pinnae only 1~2 pairs slightly shortened, pinnae stipitate, petiole slightly shorter than lamina; scales at petiole base pale brown. Liaoning, Beijing, Hebei, Shanxi, Shaanxi, Gansu, Ningxia, Anhui, Taiwan, Zhejiang, Jiangxi, Shandong, Henan, Hunan, Guangxi, Sichuan, Guizhou and Yunnan; Japan, Korea, Nepal, Viet Nam and Burma.

孢子囊群短线形、长圆形或长弯钩形;囊群盖淡棕色,边缘略呈啮蚀状;根状茎短横卧;叶近生;叶片卵形至长卵形,顶部急缩,下部羽片仅1~2对稍缩短,羽片有柄,叶柄仅稍短于叶片;叶柄基部鳞片淡棕色。产辽宁、北京、河北、山西、陕西、甘肃、宁夏、安徽、台湾、浙江、江西、山东、河南、湖南、广西、四川、贵州和云南等省区;国外分布于日本、朝鲜、尼泊尔、越南和缅甸。

Type of the series: 日本蹄盖蕨 *Athyrium niponicum* (Mett.) Hance

Species: 本系有2种。日本蹄盖蕨 *A. niponicum* (Mett.) Hance, 中缅蹄盖蕨 *A. brevisorum* (Wall. ex Hook.) Moore

系3. 麦秆蹄盖蕨系 Ser. 3. *Fallaciosa* Z. R. Wang, ser. nov.

Sori plerumque reniformes vel hippocrepiformes; indusia pallida, ciliatavel erosa; rhizoma breviter prostratum vel suberectum; frondes caespitosae; laminae oblongae, lanceolatae vel oblanceolatae, apice acuminatae, basi sensim attenuatae; pinnae sessiles; petioli laminis magis breviores, basi paleis rassis vel castaneis obtecti.

Sori usually reniform or hippocrepiform; indusia pallid, ciliated or erose; rhizome shortly prostrate or suberect; fronds caespitose; laminae oblong, lanceolate or oblanceolate, acuminate at apex, tapering towards the base; pinnae sessile; petiole far shorter than lamina; scales at petiole bases russet or castaneous. Northeast China, North China and Shaanxi, Gansu, Ningxia, Henan, Hubei, Sichuan, Yunnan, Southeast Xizang; Korea, Japan, Nepal, Sikkim, Bhutan, Kashmir, India and North Pakistan.

孢子囊群多为圆肾形或马蹄形;囊群盖灰白色,边缘具睫毛或啮蚀状;根状茎短横卧或近直立;叶簇生;叶片长圆状披针形或倒披针形,顶部渐尖,羽片无柄;叶基部羽片多对逐渐缩短;叶柄远较叶片短;叶柄基部鳞片红棕色或栗色。产东北、华北及陕西、甘肃、宁夏、河南、湖北、四川、云南和西藏东南部;国外分布于朝鲜、日本、尼泊尔、锡金、不丹、克什米尔、印度和巴基斯坦北部。

Type of the series: 麦秆蹄盖蕨 *Athyrium fallaciosum* Milde

Species: 本系有3种。麦秆蹄盖蕨 *A. fallaciosum* Milde, 岩生蹄盖蕨 *A. rupicola* (Edgew ex Hope) C. Chr., 腺毛蹄盖蕨 *A. glandulosum* Ching

系4. 禾秆蹄盖蕨系 Ser. 4. *Yokoscentia* Z. R. Wang, ser. nov.

Sori elliptici, J-formes vel hippocrepiformes; indusia pallidebrunnea, integra; rhizoma suberectum; frondes fasciculatae; laminae oblongo lanceolatae, apice acuminatae; pinnae sessiles, basales non vel paulo abbreviatae; petioli laminis leviter breviores, basi paleis brunneis obtecti.

Sori elliptic, J-shaped or hippocrepiform; indusia pale brown, entire; rhizome suberect; fronds fasciculate; laminae oblong lanceolate, apex acuminate; pinnae sessile, basal pinnae not shortened or slightly shortened; petiole only a little shorter than lamina; scales at petiole bases brown. Liaoning, Henan, Shandong, Jiangsu, Zhejiang, Anhui, Hunan, Jiangxi, Sichuan and Guizhou; Korea and Japan.

孢子囊群椭圆形、弯钩或马蹄形; 囊群盖淡棕色, 全缘; 根状茎近直立; 叶簇生; 叶片长圆状披针形, 顶部渐尖, 羽片无柄; 叶基部羽片不缩短或几不缩短; 叶柄稍短于叶片; 叶柄基部鳞片棕色。产辽宁、河南、山东、江苏、浙江、安徽、湖南、江西、四川和贵州; 国外分布于朝鲜和日本。

Type of the series: 禾秆蹄盖蕨 *Athyrium yokoscense* (Franch. et Sav.) Christ

Species: 本系有 2 种。禾秆蹄盖蕨 *A. yokoscense* (Franch. et Sav.) Christ, 佛瑞蹄盖蕨 *A. fauriei* (Christ) Makino

组 5. 耳状蹄盖蕨组 Sect. 5. **Polystichoides** Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4): 130. 1986. emend. —Series *Macrocarpa* Ching et Y. T. Hsieh ib. —Series *Fimbriata* Ching et Y. T. Hsieh ib. —Sect. *Macrocarpas* Ching apud S. H. Wu et R. C. Ching, Fern Famil. Gen. China. 279~281. 1991, nom. nud. inval.

Spores perispore with folds; sori elliptic, short linear, J-shaped, hippocrepiform or reniform; indusia persistent, rarely incomplete but visible, at least when tender; rhizome erect, fronds fasciculate; pinnae usually with short stipes, auriculate at their acroscopic bases or basal pinnules anadromic; costae and costules without spine like processes adaxially. Jiangxi, Hunan, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Southeast Xizang and Taiwan; Japan, Bhutan, Nepal, Sikkim, North India, Burma, Viet Nam, Thailand, Malaysia, Sri Lanka, Indonesia and The Philippines.

孢子周壁表面有褶皱; 孢子囊群椭圆、短线、弯钩、马蹄或圆肾等形状; 囊群盖宿存, 少有残存能见, 或至少幼嫩时可见; 根状茎直立, 叶簇生; 羽片通常有短柄, 基部上侧呈耳状或基部小羽片上先出; 羽轴及小羽片中肋上面无刺状突起。产江西、湖南、广东、广西、四川、贵州、云南、西藏东南部和台湾; 国外分布于日本、不丹、尼泊尔、锡金、印度北部、缅甸、越南、泰国、马来西亚、斯里兰卡、印度尼西亚和菲律宾。

Type of the section: 宿蹄盖蕨 *Athyrium anisopterum* Christ

Species: 本组有 8 种。红苞蹄盖蕨 *A. nakanoi* Makino, 贞丰蹄盖蕨 *A. zhenfengense* Ching, 圆囊蹄盖蕨 *A. bucahwangense* Ching, 红柄蹄盖蕨 *A. erythropodum* Hay., 多变蹄盖蕨 *A. drepanopterum* (Kunze) A. Br. ex Milde, 宿蹄盖蕨 *A. anisopterum* Christ, 大盖蹄盖蕨 *A. foliolosum* Wall. apud T. Moore ex R. Sim, 喜马拉雅蹄盖蕨 *A. fimbriatum* (Wall. ex Hook.) T. Moore

组 6. 小蹄盖蕨组 Sect. 6. **Minima** Z. R. Wang, sect. nov.

Episorium sporae haud plicatum in superficie; rhizoma erectum, frondes fasciculatae; costae vel costulae adaxialiter processibus spiniformibus carentes; pinnae basi manifeste delatatae, asymmetricae, acroscopice auriculatae basiscopice vulgo cuneatae; si frondes bipinnatifidae vel magis divisae, lobi vel pinnulae anadromae; planta parva, frondes fertiles non ultra 10

cm longae.

Spore perispore without folds; rhizome erect, fronds fasciculate; costae or costules without spine like processes adaxially; pinna bases prominently broader, asymmetrical, auriculate at the acroscopic bases, cuneate at the basiscopic bases usually; if fronds divided more than bipinnatifid, lobes or pinnules anadromic; small plants, fertile fronds no more than 10 cm long. Taiwan.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或小羽片中肋上面无刺状突起; 羽片基部明显增宽, 不对称, 上侧增大呈耳形, 下侧通常楔形; 叶片若为一回羽状以上分裂, 其裂片或小羽片均为上先出; 小型植物, 能育叶长不逾 10 厘米。特产台湾。

Type of the section: 小蹄盖蕨 *Athyrium minimum* Ching

Species: 本组只有 1 种。小蹄盖蕨 *A. minimum* Ching

组 7. 毛叶蹄盖蕨组 Sect. 7. **Suprapubescentia** Z. R. Wang, sect. nov.

Episorium sporae haud plicatum in superficie; rhizoma erectum, frondes fasciculatae; costae vel costulae adaxialiter processibus spiniformibus carentes; pinnae sessiles, pinnulae vel lobi catadromae vel oppositae; planta mediocris frondes fertiles ultra 10 cm longae; laminae adaxialiter dense pubescentes.

Spore perispore without folds; rhizome erect, fronds fasciculate; costae or costules without spine like processes adaxially; pinnae sessile, pinnules or lobes of middle pinnae catadromic or opposite; middle plants, fertile fronds more than 10 cm long; laminae densely pubescent adaxially. Sichuan.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或小羽片中肋上面无刺状突起; 羽片无柄, 中部羽片的小羽片或裂片下先出或对生; 中型植物, 能育叶长在 10 厘米以上; 叶片上面密被短毛。特产四川。

Type of the section: 上毛蹄盖蕨 *Athyrium suprapubescentis* Ching

Species: 本组有 2 种。绢毛蹄盖蕨 *A. sericellum* Ching, 上毛蹄盖蕨 *A. suprapubescentis* Ching

组 8. 海南蹄盖蕨组 Sect. 8. **Hainanensia** Z. R. Wang, sect. nov.

Episorium sporae haud plicatum in superficie; sori oblongi; costae vel costulae adaxialiter processibus spiniformibus carentes; rachis et costae abaxialiter pilis brevibus glandulosis obtectae; petioli basin versus nec angustati; laminae triangulari ovatae, apice cuspidatae, pinnae basales aliquot jugae suboppositae; infimae basi manifeste consrictae basibus, lobis basiscopicis eis acroscopicis longioribus.

Spores perispore without folds; sori oblong; costae or costules without spine like processes adaxially; rachis and costae shortly glandular pubescent abaxially; petiole not tapering downward to the base; laminae triangular ovate, apex cuspidate, basal several pairs of pinnae subopposite; the basal pair of pinnae prominently constricted at the base, their basiscopic lobes longer than the acroscopic ones. Hainan.

孢子周壁表面无褶皱; 孢子囊群长圆形; 羽轴或小羽轴上面无刺状突起; 叶轴和羽轴下面被短腺毛; 叶柄基部不变尖削; 叶片三角状卵形, 顶端急狭缩, 下部数对羽片近对生, 基部

对羽片的基本部明显收缩, 羽轴下侧裂片较上侧的长。特产海南。

Type of the section: 海南蹄盖蕨 *Athyrium hainanense* Ching

Species: 本组只有 1 种。海南蹄盖蕨 *A. hainanense* Ching

组 9. 裸囊蹄盖蕨组 Sect. 9. *Pachyphylla* Z. R. Wang, sect. nov.

Episorium sporaе haud plicatum in superficie; rhizoma erectum, frondes fasciculatae; costae vel costulae adaxialiter processibus spiniformibus carentes; sori vulgo breviter lineares vel oblongi, interdum J—formes; indusia valde redacta vel normaliter evoluta; rhaches et costae abaxialiter pilis brevibus glandulosis sparsim obtectae; laminae oblongo lanceolatae, apice acuminatae, basi leviter angustatae, pinnatae; pinnae pinnatifidae, sessiles, basi subsymmetricae, alternae; pinnarum basium lobi acroscopici eis basiscopicis fere aequilongi.

Spores perispore without folds; rhizome erect, fronds fasciculate; costae or costules without spine like processes adaxially; sori usually short linear or oblong, rarely J—shaped; indusia extremelly incomplate or complate; rachis and costae sparsely bearing short glandular hairs abaxially; laminae oblong lanceolate, apex acuminate, base slightly narrowed, pinnate; pinnae pinnatifid, sessile, base subsymmetric, alternate; acroscopic lobes of the basal pair of pinnae almost equet to basiscopic ones. North Guangxi, South Guizhou and Southeast Yunnan.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或小羽片中肋上面无刺状突起; 孢子囊群多为短线形或长圆形, 少有弯钩形; 囊群盖极度退化或完整; 叶轴和羽轴下略被短腺毛; 叶片长圆状披针形, 顶端渐尖, 基部略变狭, 一回羽状; 羽片羽裂, 无柄, 基部近对称, 互生; 基部一对羽片的羽轴上下两侧裂片近等长。产广西北部、贵州南部和云南东南部。

Type of the section: 裸囊蹄盖蕨 *Athyrium pachyphyllum* Ching

Species: 本组有 2 种。裸囊蹄盖蕨 *A. pachyphyllum* Ching, 启无蹄盖蕨 *A. wangii* Ching

组 10. 蹄盖蕨组 Sect. 10. *Athyrium* —Ser. *Filix femina* Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6(4): 131. 1986, nom. illegit. —Sect. *Filix femina* Ching et Y. T. Hsieh in Y. T. Hsieh ib. p130 ~ 131. 1986, nom. illegit., pro parte. —Subgenus *Athyrium* Ching et Y. T. Hsieh ib. pro parte.

Spore perispore without folds; rhizome erect, fronds fasciculate; costae or costules without processes adaxially; pinnae sessile, base symmetric or subsymmetric; petiole tapering downward to the base; sori usually oblong, sometimes J—shaped or hippocrepiform; rachis and costae sparsely squarrose glandular pubescent abaxially. From Northeast China to Xizang; The temperate zone of north hemisphere.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或中肋上面无刺状突起; 羽片无柄, 基部对称或近对称; 叶柄基部向下变尖削; 孢子囊群多为长圆形, 有时弯钩、马蹄形; 叶轴和羽轴下面疏被棘头状短腺毛。产东北至西藏; 国外分布于北半球温带。

Type of the section: 蹄盖蕨 *Athyrium filix femina* (L.) Roth

Species: 本组有 11 种。黑鳞蹄盖蕨 *A. melanolepis* (Franch. et Sav.) Christ, 东北蹄盖蕨 *A. brevifrons* Nakai ex Kitagawa, 黑龙江蹄盖蕨 *A. rubripes* (Kom.) Kom., 中华蹄盖蕨 *A. sinense* Rupr., 剑叶蹄盖蕨 *A. attenuatum* (Clarke) Tagawa, 察陇蹄盖蕨 *A.*

tarulakaense Ching, 短羽蹄盖蕨 *A. contingens* Ching et S. K. Wu, 疏羽蹄盖蕨 *A. nephrodioides* (Bak.) Christ, 斜羽蹄盖蕨 *A. adscendens* Ching, 希陶蹄盖蕨 *A. dentigerum* (Wall. ex Clarke) Mehra et Bir

组 11. 狭基蹄盖蕨组 Sect. 11. **Stenopoda** Z. R. Wang, sect. nov.

Episorium sporae haud plicatum in superficie; rhizoma erectum, frondes fasciculatae; rhaches et costae adaxialiter processibus spiniformibus brevibus munitae; laminae oblanceolatae, pinnatae; pinnulae pinnatilobatae dum pinnatipartitae, inferiores gradatim basin versus abbreviatae, basales saepe valde abbreviatae auriformes.

Spore perispore without folds; rhizome erect, fronds fasciculate; rachis and costae bearing short spine like processes adaxially; laminae pinnate, oblanceolate; pinnulae shallowly lobed to deeply lobed, basal many pairs of pinnulae gradually shortened towards the base, the basal pair of pinnulae often shortened as auriculate. Southeast Xizang and Yunnan; Sikkim.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 叶轴和羽轴上面具有短刺状突起; 叶片一回羽状, 倒披针形, 羽片浅裂至深裂, 下部羽片多对逐渐缩短, 基部一对羽片往往缩短呈耳形。产西藏东南部 and 云南; 国外分布于锡金。

Type of the section: 狭基蹄盖蕨 *Athyrium mehrae* Bir

Species: 本组只有 1 种。狭基蹄盖蕨 *A. mehrae* Bir

组 12. 多羽蹄盖蕨组 Sect. 12. **Multipinna** Z. R. Wang, sect. nov.

Episorium sporae haud plicatum in superficie; rhizomae erecta, frondes fasciculatae; rhaches et costae adaxialiter processibus spiniformibus brevibus munitae; laminae anguste lanceolatae, pinnulae ultra 20 ~ 25 jugae; infimae 1 ~ 2 jugae leviter abbreviatae, infimae 1—jugae haud abbreviatae tenuis auriformes.

Spore perispore without folds; rhizome erect, fronds fasciculate; rachis and costae bearing short spine like processes adaxially; laminae narrow lanceolate, pinnulae more than 20 ~ 25 pairs; basal 1 ~ 2 pairs of pinnulae slightly shortened, but the basal pair of pinnulae never shortened as auriculate. Zhejiang, Hunan, Jiangxi, North Guangxi and Guizhou.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 叶轴和羽轴上面有短刺状突起; 叶片狭披针形, 羽片在 20 ~ 25 对以上; 下部羽片 1 ~ 2 对稍缩短, 基部一对羽片从不缩短成耳形。产浙江、湖南、江西、广西北部 and 贵州。

Type of the section: 多羽蹄盖蕨 *Athyrium multipinnum* Y. T. Hsieh et Z. R. Wang

Species: 本组有 2 种。多羽蹄盖蕨 *A. multipinnum* Y. T. Hsieh et Z. R. Wang, 长叶蹄盖蕨 *A. elongatum* Ching

组 13. 川滇蹄盖蕨组 Sect. 13. **Mackinnoniana** (Ching et Y. T. Hsieh) Z. R. Wang, stat. nov. —Ser. *Mackinnoniana* [*Mackinnoniana*] Ching et Y. T. Hsieh in Y. T. Hsieh in Bull. Bot. Res. 6 (4): 132. 1986. —Sect. *Echinoathyrium* Ching et Y. T. Hsieh ib. pro parte, Ser. *Epirachne* Ching et Y. T. Hsieh ib. p133 excl. —Sect. *Echinoathyrium* Ching apud S. H. Wu et R. C. Ching, Fern Famil. Gen. China 279 ~ 281. 1991, nom. nud. inval., pro parte.

Spore perispore without folds; rhizome erect, fronds fasciculate; costae, costules or second

costules bearing short spine like processes adaxially; laminae broad, pinnate to tripinnate, narrow ovate to deltoid ovate, basal pinnae not shortened, or at most 1 to a few pairs slightly shortened; indusia reniform, elliptic, short linear, J—shaped and hippocrepiform, lateral by, crossed over or dorsifixed on veinlets; scales at petiole bases usually yellowish brown, brown or dark brown. The south of China from Qinling; Japan, Korea, Sikkim, Nepal, North India, Viet Nam, Burma, Thailand, Pakistan, Afghanistan, Himalaya area and The Philippines.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或连同小羽轴、中肋上面具有短刺状突起; 叶片较阔, 一至三回羽状, 长卵形至三角状卵形, 下部羽片不缩短, 或至多一至数对稍缩短; 囊群盖呈圆肾、椭圆、短线、弯钩和马蹄等多种形状, 侧生、横跨或背生于叶脉上; 叶柄基部鳞片常为黄棕色、棕色或深棕色。产秦岭以南各省区; 国外分布于日本、朝鲜、锡金、尼泊尔、印度北部、越南、缅甸、泰国、巴基斯坦、阿富汗、喜马拉雅其他地区以及菲律宾。

Type of the section: 川滇蹄盖蕨 *Athyrium mackinnonii* (Hope) C. Chr.

本组有 4 系。

系 1. 湿生蹄盖蕨系 Ser. 1. **Devoliana** Z. R. Wang, ser. nov.

Indusia hippocrepiformia, curvata vel elliptica, blunneola, margine ciliata; laminae anguste oblongae vel late ovatae, bipinnatae; pinnulae basales vel lobi pinnarum superiorum anadromae, interdum catadromae vel suboppositae; pinnae apicales laminarum et pinnulae apicales pinnarum saepe reflexae vel horizontales; rhaches et costae stramineae, costae adaxialiter processibus spiniformibus brevissimis munitae, abaxialiter glabrae vel sparsissime pilosae; petioli basi paleis saepe brunneolis obtecti.

Indusia hippocrepiform, curved or elliptic, pale brown, margin ciliated; laminae narrow oblong to broad ovate, bipinnate; basal pinnules or lobes of supra medial pinnae anadromic, occasionally catadromic or subopposite, apical pinnae of laminae and apical pinnules of pinnae often reflexed or horizontal; raches and costae stramineous, costae bearing very short spine like processes adaxially, glabrous or extremely sparsely pubescent abaxially; scales at petiole bases usually pale brown. Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan; Japan, Korea and The Philippines.

囊群盖呈马蹄、弯弓或椭圆形, 灰棕色, 边缘有睫毛; 叶片狭长圆形至阔卵形, 二回羽状; 叶中部以上羽片之小羽片或羽裂片上先出, 偶下先出或近对生, 叶片及羽片顶部小羽片往往向下反或平伸; 叶轴及羽轴禾秆色, 羽轴上面具有极短刺状突起, 下面无毛或具极疏毛; 叶柄基部鳞片常为淡棕色。产浙江、福建、江西、湖南、广西、四川、贵州、云南、西藏和台湾; 国外分布于日本、朝鲜和菲律宾。

Type of the series: 湿生蹄盖蕨 *Athyrium devolii* Ching

Species: 本系有 9 种。逆叶蹄盖蕨 *A. reflexipinnum* Hayata, 湿生蹄盖蕨 *A. devolii* Ching, 白山祖蹄盖蕨 *A. baishanzuense* Ching et Y. T. Hsieh, 昂山蹄盖蕨 *A. maoshanense* Ching et P. S. Chiu, 三回蹄盖蕨 *A. tripinnatum* Tagawa, 溪边蹄盖蕨 *A. deltoidofrons* Makino, 薄叶蹄盖蕨 *A. delicatulum* Ching et S. K. Wu, 对生蹄盖蕨 *A. oppositipinnum* Hayata, 粗柄蹄盖蕨 *A. crassipes* Ching.

系 2. 峨嵋蹄盖蕨系 Ser. 2. **Omeiensia** Z. R. Wang, ser. nov.

costules bearing short spine like processes adaxially; laminae broad, pinnate to tripinnate, narrow ovate to deltoid ovate, basal pinnae not shortened, or at most 1 to a few pairs slightly shortened; indusia reniform, elliptic, short linear, J—shaped and hippocrepiform, lateral by, crossed over or dorsifixed on veinlets; scales at petiole bases usually yellowish brown, brown or dark brown. The south of China from Qinling; Japan, Korea, Sikkim, Nepal, North India, Viet Nam, Burma, Thailand, Pakistan, Afghanistan, Himalaya area and The Philippines.

孢子周壁表面无褶皱; 根状茎直立, 叶簇生; 羽轴或连同小羽轴、中肋上面具有短刺状突起; 叶片较阔, 一至三回羽状, 长卵形至三角状卵形, 下部羽片不缩短, 或至多一至数对稍缩短; 囊群盖呈圆肾、椭圆、短线、弯钩和马蹄等多种形状, 侧生、横跨或背生于叶脉上; 叶柄基部鳞片常为黄棕色、棕色或深棕色。产秦岭以南各省区; 国外分布于日本、朝鲜、锡金、尼泊尔、印度北部、越南、缅甸、泰国、巴基斯坦、阿富汗、喜马拉雅其他地区以及菲律宾。

Type of the section: 川滇蹄盖蕨 *Athyrium mackinnonii* (Hope) C. Chr.

本组有 4 系。

系 1. 湿生蹄盖蕨系 Ser. 1. **Devoliana** Z. R. Wang, ser. nov.

Indusia hippocrepiformia, curvata vel elliptica, blunneola, margine ciliata; laminae anguste oblongae vel late ovatae, bipinnatae; pinnulae basales vel lobi pinnarum superiorum anadromae, interdum catadromae vel suboppositae; pinnae apicales laminarum et pinnulae apicales pinnarum saepe reflexae vel horizontales; rhaches et costae stramineae, costae adaxialiter processibus spiniformibus brevissimis munitae, abaxialiter glabrae vel sparsissime pilosae; petioli basi paleis saepe brunneolis obtecti.

Indusia hippocrepiform, curved or elliptic, pale brown, margin ciliated; laminae narrow oblong to broad ovate, bipinnate; basal pinnules or lobes of supra medial pinnae anadromic, occasionally catadromic or subopposite, apical pinnae of laminae and apical pinnules of pinnae often reflexed or horizontal; raches and costae stramineous, costae bearing very short spine like processes adaxially, glabrous or extremely sparsely pubescent abaxially; scales at petiole bases usually pale brown. Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan; Japan, Korea and The Philippines.

囊群盖呈马蹄、弯弓或椭圆形, 灰棕色, 边缘有睫毛; 叶片狭长圆形至阔卵形, 二回羽状; 叶中部以上羽片之小羽片或羽裂片上先出, 偶下先出或近对生, 叶片及羽片顶部小羽片往往向下反或平伸; 叶轴及羽轴禾秆色, 羽轴上面具有极短刺状突起, 下面无毛或具极疏毛; 叶柄基部鳞片常为淡棕色。产浙江、福建、江西、湖南、广西、四川、贵州、云南、西藏和台湾; 国外分布于日本、朝鲜和菲律宾。

Type of the series: 湿生蹄盖蕨 *Athyrium devolii* Ching

Species: 本系有 9 种。逆叶蹄盖蕨 *A. reflexipinnum* Hayata, 湿生蹄盖蕨 *A. devolii* Ching, 百山祖蹄盖蕨 *A. baishanzuense* Ching et Y. T. Hsieh, 昂山蹄盖蕨 *A. maoshanense* Ching et P. S. Chiu, 三回蹄盖蕨 *A. tripinnatum* Tagawa, 溪边蹄盖蕨 *A. deltoidifrons* Makino, 薄叶蹄盖蕨 *A. delicatulum* Ching et S. K. Wu, 对生蹄盖蕨 *A. oppositipinnum* Hayata, 粗柄蹄盖蕨 *A. crassipes* Ching.

系 2. 峨嵋蹄盖蕨系 Ser. 2. **Omeiensia** Z. R. Wang, ser. nov.